

REMARKS

At the outset, the Examiner is thanked for the thorough review and consideration of the pending application. The Office Action dated May 30, 2008 has been received and its contents carefully reviewed.

With this response, claim 1 has been amended. No new matter has been added. Accordingly, claims 1, 3 and 5-15 are currently pending in this application with claims 11-15 having been withdrawn in response to the Examiner's requirement for restriction

In the Office Action, claims 1, 3 and 5-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent No. 06-114,315 to *Ishida* (hereafter "*Ishida*").

Claims 1, 3 and 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ishida* in view of Stepper Motor System Basics, published at www.ams2000.com on 8/7/2000 (hereafter "*Stepper Motor System Basics*").

Claims 1, 3 and 5-10 are rejected under 35 U.S.C. 102(b) as being anticipated by *Ishida*. Applicant respectfully traverses this rejection for at least the following reasons.

Applicants respectfully submit that *Ishida* does not anticipate claims 1, 3 and 5-10 because it does not teach each and every element as set forth in the claims. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Moreover, "The elements must be arranged as required by the claim." MPEP § 2131.

The Examiner also asserts that "the main unit is capable of being such that the main unit recognizes an absence of change in the electrical signal as the nozzle is in contact with the substrate and controls the vertical driving stepping motor to stop the lowering of the body. Additionally, paragraph 0015-0016 recite that (emphasis added):

[0015] In drawing 2, the **contact** detection sensor 13 in which the nozzle support 12 detects that the paste delivery of a nozzle 1 contacted the front face of a substrate 7 again by fixed part 4b through slide section 12a and engagement section 12b is being fixed to the Z-axis table section 4 for the optical displacement meter 3 of the Z-axis table section 4 by fixed part 4a by fixed part 4c, respectively.

[0016] As for the contact detection sensor 13, an eddy current type displacement gage is used as an example. Emit RF magnetic flux to the nozzle support 12 from a sensor coil, make the nozzle support 12 generate an eddy current, it is made for the field by this eddy current to change the impedance of a sensor coil, and this measures distance from the **change of an impedance since corresponding to distance in change of this impedance.**”

However, applicants submit that *Ishida* does not disclose at least, for example, “a first sensor in the body for detecting whether the nozzle of the syringe is in contact with the substrate after the body is lowered; a second sensor for detecting a gap distance between the nozzle and the substrate; and a main unit for controlling the vertical driving stepping motor in response to an output from the second sensor to obtain a desired gap distance between the nozzle and the substrate, wherein the first sensor includes magnetic sensor sending an electric signal to the main unit that changes as the body is lowered by the vertical driving stepping motor toward the table, wherein when the nozzle is in contact with the substrate, the lowering of the body stops so that the electrical signal stops changing and wherein the main unit recognizes an absence of change in the electrical signal as the nozzle is in contact with the substrate and controls the vertical driving stepping motor to stop the lowering of the body, to raise the body so that a desired gap distance can be obtained between the nozzle and the substrate based upon an output from the second sensor, and to raise and lower the body so that a desired gap can be maintained between the nozzle and the substrate” as recited in claim 1.

That is, as claimed in the present invention, a method for controlling a gap distance between a nozzle and a substrate using the dispenser includes lowering the body having the syringe mounted therein using the vertical driving stepping motor; detecting whether the nozzle of the syringe is in contact with the substrate; raising body; detecting a gap distance between the nozzle and the substrate; and controlling the vertical driving stepping motor so that the gap distance between the nozzle and the substrate obtains a desired gap distance.

The dispenser for a liquid crystal display panel and the method for controlling a gap distance between the nozzle and the substrate using the dispenser of the present invention will now be described in detail. First, the substrate is loaded onto the table. The vertical driving stepping motor is then driven to lower the body having the syringe mounted therein. After the

body is lowered, the first sensor is used to detect whether the nozzle provided at an end portion of the syringe is in contact with the substrate.

If the table is metallic, a magnetic sensor, for example, can be used as the first sensor. The magnetic sensor in the body sends a signal to the control unit that changes as the body is lowered by the vertical driving stepping motor toward the table. When the nozzle is in contact with the substrate, the lowering of the body stops so that the electric signal stops changing. The control unit recognizes an absence of change in the electric signal as the nozzle being in contact with the substrate. When the control unit recognizes that lowering of the body has stopped, the control unit stops the vertical driving stepping motor.

After the control unit has controlled the vertical driving stepping motor to stop the lowering of the body, the control unit controls the vertical driving stepping motor to raise the body. A second sensor is used to detect the gap distance between the nozzle and the substrate. Based upon an output from the second sensor, the control unit controls the vertical driving stepping motor to raise the body so that a desired gap distance can be obtained between the nozzle and the substrate. Subsequently, the control unit controls the vertical driving stepping motor to raise and lower the body so that a desired gap distance can be maintained between the nozzle and the substrate.

On the contrary, *Ishida* merely discloses that “Z axial-tables part 4 is driven, and if paste cartridge PC with which it was equipped as mentioned above is lowered to the direction of the substrate 7 and it goes, the paste delivery of the nozzle 1 will contact the surface of the substrate 7. Since the contact detecting sensor 13 descends with paste cartridge PC until now, the distance by the measure point T of the surface of the nozzle supporting device 12 which the contact detecting sensor 13 is measuring does not change, therefore the impedance of the sensor coil of the contact detecting sensor 13 does not change. When the paste delivery of the nozzle 1 contacts the surface of the substrate 7, it becomes impossible for paste cartridge PC to descend, and it will move up to the holding part 4b with the drive of Z axial-tables part 4. For this reason, the distance by the measure point T of the surface of the nozzle supporting device 12 which the contact detecting sensor 13 is measuring begins to change, and the impedance of the sensor coil of the contact detecting sensor 13 begins to change from this change time. The contact detecting sensor 13 catches the change start time of the impedance of this sensor coil, and it detects that

the paste delivery of the nozzle 1 contacted the surface of the substrate 7 as this is also.” See also paragraph [0018].

Because *Ishida* does not teach each and every element of independent claim 1, *Ishida* not anticipate independent claim 1. Furthermore, *Ishida* dose not anticipate claim 3 and 5-10 by virtue of their dependency from claim 1.

The rejection of claims 1, 3 and 5-20 under 35 U.S.C. 103(a) as being unpatentable over *Ishida* in view of *Stepper Motor System Basics* is respectfully traversed and reconsideration is requested.

Claim 1 is allowable at least in that this claim recites a combination of elements, including, for example, “a first sensor in the body for detecting whether the nozzle of the syringe is in contact with the substrate after the body is lowered; a second sensor for detecting a gap distance between the nozzle and the substrate; and a main unit for controlling the vertical driving stepping motor in response to an output from the second sensor to obtain a desired gap distance between the nozzle and the substrate, wherein the first sensor includes magnetic sensor sending an electric signal to the main unit that changes as the body is lowered by the vertical driving stepping motor toward the table, wherein when the nozzle is in contact with the substrate, the lowering of the body stops so that the electrical signal stops changing and wherein the main unit recognizes an absence of change in the electrical signal as the nozzle is in contact with the substrate and controls the vertical driving stepping motor to stop the lowering of the body, to raise the body so that a desired gap distance can be obtained between the nozzle and the substrate based upon an output from the second sensor, and to raise and lower the body so that a desired gap can be maintained between the nozzle and the substrate”. None of the cited references, singly or in combination, teaches or suggests at least the aforementioned features of the claimed invention.

Accordingly, Applicants respectfully submit that claim 1 and claims 3 and 5~10, which depend from claim 1, are allowable over the cited references.

Applicants believe the foregoing amendments place the application in condition for allowance and early, favorable action is respectfully solicited.

Application No.: 10/726,584
Amdt. dated October 29, 2008
Reply to Office Action dated May 30, 2008

Docket No.: 8734.266 US

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at (202) 496-7500 to discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911.

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Respectfully submitted,

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